Paper No. 24

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte RONALD J. NAGAHARA and DAWN M. LEE

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Appeal No. 2001-2184
Application 09/005,364

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ON BRIEF

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Before WARREN, OWENS and WALTZ, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal is from the final rejection of claims 17, 19 and 21-23, which are all of the claims remaining in the application.

THE INVENTION

The appellants' claimed invention is directed toward a chemical mechanical polishing method for planarizing a surface of

a semiconductor wafer. Claim 17 is illustrative:

17. A method for planarizing a first surface of a semiconductor wafer using chemical mechanical polishing, the method comprising:

holding the semiconductor wafer over a chemical mechanical polishing pad;

applying a non-uniform pressure distribution directly over a second surface of the semiconductor wafer, said non-uniform pressure distribution comprising a plurality of different positive pressures and at least one negative pressure applied simultaneously at different positions over the second surface of the semiconductor wafer; and

polishing the first surface of the semiconductor wafer using the chemical mechanical polishing pad, wherein the non-uniform pressure distribution is applied directly over the second surface of the semiconductor wafer while the first surface of the semiconductor wafer is polished.

THE REFERENCES

Nakashiba et al. (Nakashiba)	5,762,539	Jun. 9, 1998 (filed Feb. 27, 1997)
Tanaka et al. (Tanaka)	5,797,789	Aug. 25, 1998 (filed May 5, 1997)

THE REJECTION

Claims 17, 19 and 21-23 stand rejected under 35 U.S.C. § 103 as being unpatentable over the combined teachings of Nakashiba and Tanaka.

OPINION

We reverse the aforementioned rejection. We need to address only claim 17, which is the sole independent claim.

Nakashiba discloses a chemical mechanical polishing method for planarizing a first surface of a semiconductor wafer by holding the wafer over a chemical mechanical polishing pad, applying directly over a second surface of the wafer a non-uniform pressure distribution comprising a plurality of different simultaneously applied positive pressures, and polishing the first surface of the wafer by pressing it against the chemical mechanical polishing pad while the non-uniform pressure distribution is applied directly over the second surface of the wafer (col. 4, line 37 - col. 5, line 34). Nakashiba does not disclose applying over the second surface of the wafer, simultaneously with the plurality of different positive pressures, at least one negative pressure.

Tanaka discloses a method for chemical mechanical polishing a semiconductor wafer by holding a second surface of the wafer by vacuum suction while a first surface of the wafer is polished by rotating it against a polishing pad (col. 5, lines 26-36; figure 1). Gelation suppression members, which introduce water into the system, are used to suppress gelation of the abrasive

slurry caused by water from the slurry being sucked into the vacuum passages (col. 1, line 60 - col. 2, line 2; col. 6, line 49 - col. 9, line 56).

The examiner argues that "[it} would have been obvious to one of ordinary skill in the art to modify Nakashiba's apparatus in light of Tanaka's apparatus by using the second mechanism to supply the negative pressure along with the positive pressure simultaneously across the second surface of the wafer because according to Tanaka as well as it is well known to one skill[ed] in the art that the negative pressure would hold the wafer during the polishing process. This modification would produce the claimed invention with an anticipation of an expected result" (answer, page 4). The examiner also argues that "it is obvious that it is essential to hold the wafer during the polishing process, otherwise the wafer would get lose [sic] and is damaged without a hold force. Tanaka certainly teaches the use of vacuum to hold the wafer during polishing. Therefore, it would be obvious for one [of] ordinary skill in the art to apply a vacuum (negative pressure) to Nakashiba's method of using different positive forces in order to keep the wafer during the polishing process" (answer, page 5). The examiner further argues that "[a] vacuum on the back of the wafer would be apparently to one

skill[ed] in the art that it would change the pressure applied to the back of the wafer. Therefore, it would be obvious for one skill[ed] in the art to apply a vacuum in order to hold the wafer or to adjust the pressure during the polishing." *See id.*

In order for a *prima facie* case of obviousness to be established, the teachings from the prior art itself must appear to have suggested the claimed subject matter to one of ordinary skill in the art. *See In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976). The mere fact that the prior art could be modified as proposed by the examiner is not sufficient to establish a *prima facie* case of obviousness. *See In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992).

Nakashiba teaches that the wafer is placed in recess 1a and held against elastic pad 2 (col. 9, line 67 - col. 10, line 2). Nakashiba does not indicate that there is any need for an additional mechanism to hold the wafer. It reasonably appears, therefore, that Nakashiba would have indicated to one of ordinary skill in the art that Nakashiba's wafer holding mechanism is an alternative to Tanaka's vacuum mechanism.

The examiner has not explained how one of ordinary skill in the art, given the teaching by Tanaka that vacuum suction tends to cause slurry gelation, and considering the lack of an indication by Nakashiba that any additional wafer holding mechanism is needed, would have been led by the references themselves to use vacuum to hold Nakashiba's wafer. Furthermore, the examiner clearly has not provided evidentiary support for the above-mentioned argument that the applied references would have led one of ordinary skill in the art to use vacuum to adjust the pressure on the back of the wafer while polishing the wafer.

The record indicates that the motivation relied upon by the examiner for using vacuum to hold Nakashiba's wafer and to adjust the pressure applied to the back of the wafer while polishing the wafer comes from the description of the appellants' invention in their specification rather than coming from the applied prior art. Hence, the record indicates that the examiner used impermissible hindsight when rejecting the claims. *See W.L. Gore & Associates v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984); *In re Rothermel*, 276 F.2d 393, 396, 125 USPQ 328, 331 (CCPA 1960). Accordingly, we reverse the examiner's rejection.

DECISION

The rejection of claims 17, 19 and 21-23 under 35 U.S.C. § 103 over the combined teachings of Nakashiba and Tanaka is reversed.

REVERSED

CHARLES F. WARREN Administrative Patent Judge	)	
TERRY J. OWENS Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
THOMAS A. WALTZ Administrative Patent Judge	)	

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LSI Logic Corporation
1551 McCarthy Blvd.
M/S: D-106 Patent Department
Milpitas, CA 95035